35.C10457 CONT. I

PATENT APPLICATION

#24

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	Examiner: S. Hong
MIYUKI ENOKIDA, ET AL.	)	Group Art Unit: 2772
Appln. No.: 08/907,635	)	
Filed: August 8, 1997	)	
For: MOVING IMAGE EDITING APPARATUS AND MOVING IMAGE EDITING METHOD USING INTRAFRAME ENCODING	)	October 5, 1998

The Assistant Commissioner for Patents
Washington, D.C. 20231

SUBMISSION OF SWORN TRANSLATIONS

Sir:

Further to the Amendment filed August 18, 1998, enclosed please find sworn English translations for the two Japanese priority documents claimed by the subject application.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

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D E C L A R A T I O N

I, NOBUAKI KATO, a Japanese Patent Attorney registered No. 8517, of Okabe International Patent Office at No. 602, Fuji Bldg., 2-3, Marunouchi 3-chome, Chiyoda-ku, Tokyo, Japan, hereby declare that I have a thorough knowledge of Japanese and English languages, and that the attached pages contain a correct translation into English of the priority document of Japanese Patent Application No. 6-010083 filed on January 31, 1994, in the name of CANON KABUSHIKI KAISHA.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made, are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this 22nd day of September, 1998

NOBUAKI KATO

PATENT OFFICE
JAPANESE GOVERNMENT

This is to certify that the annexed is a true copy of the following application as filed with this Office.

Date of Application: January 31, 1994

Application Number: Japanese Patent Application No. 6-010083

Applicant(s): CANON KABUSHIKI KAISHA

March 10, 1995

Commissioner,
Patent Office AKIRA TAKASHIMA (Seal)

Certificate No. 07-3007255

6-10083

[Name of the Document] Patent Application

[Reference No.] 2708031

[Date] January 31, 1994

[Address to] Director-General to the Patent Office

[International Classification] G06F 15/62

[Title of the Invention] Animating Image Editing Apparatus

[Number of Claims] 10

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[Indication of Official Fee]

[Way of Payment] Prepaid

[Prepayment Ledger No.] 011707

[Amount] 21000

[List of Filed Materials]

[Material] Specification 1

[Material] Drawings 1

[Material] Abstract 1

[General Power of Attorney's No.] 9004560

[Proof Required] Yes

6-10083

[NAME OF THE DOCUMENT]

Specification

[TITLE OF THE INVENTION]

Animating Image Editing Apparatus

[WHAT IS CLAIMED IS]

[Claim 1]

An animating image editing apparatus comprising:

decoding means for decoding encoded animating image data;

storing means for intraframe coding and storing said decoded animating image data;

editing means for decoding the images which were stored in said storing means and were intraframe encoded and for performing an arbitrary edition; and

coding means for coding said edited frame image by an animating image coding system.

[Claim 2]

An apparatus according to claim 1, wherein said encoded animating image data is transmitted from an external apparatus by a communication.

[Claim 3]

An apparatus according to claim 1, wherein said arbitrary edition is an edition in one frame or an edition in a time base direction between frames.

[Claim 4]

An apparatus according to claim 1, further including display means,

wherein said decoding means decodes a part of said animating image data in the encoded animating image data and displays to display means.

[Claim 5]

An animating image editing apparatus comprising:

intraframe detecting means for detecting an intraframe in encoded animating image data;

decoding means for decoding the animating image data of a predetermined number of frames after the frame detected by said intraframe detecting means;

storing means for storing the animating image data decoded by said decoding means on a frame unit basis;

editing means for performing an arbitrary edition to the images of the frame unit stored in said storing means; and

coding means for encoding said edited frame images by an animating image coding system.

[Claim 6]

An apparatus according to claim 5, further including intraframe coding means,

wherein after said decoded animating image data is intraframe encoded by said intraframe coding means, said storing means stores the intraframe coded animating image data.

[Claim 7]

An apparatus according to claim 5 or 6, wherein said encoded animating image data is transmitted from an external apparatus by a communication.

[Claim 8]

An apparatus according to claim 5 or 6, wherein said arbitrary edition is an edition n the frame or an edition in a time base direction between frames.

[Claim 9]

An apparatus according to claim 5 or 6, wherein said decoding means executes the decoding from the intraframe just before the frame to be edited by said editing means.

[Claim 10]

An apparatus according to claim 4, wherein said decoding means decodes a part of said animating image data in the encoded animating image data and executes the edition with said editing means by displaying to display means.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[Field of the Industrial Utilization]

The present invention relates to an animating image editing apparatus.

[0002]

[Prior Art]

As an animating image encoding system for accumulation, there is an MPEG system. As an animating image encoding system for communication such as a TV meeting,

TV telephone and the like, there is an H261 system. These systems are encouraged the international standardization.

[0003]

Each of these MPEG and H261 systems is an encoding system employing an intraframe correlation of animating image data and a system for assigning Haffman codes, so that an encoding operation is made by a variable long coding system.

[0004]

[Problems to be solved by the Invention]

However, as an encoding method of animating images, an encoding operation is executed employng an intraframe correlation such as the systems of MPEG, H261, and the like, so that it is necessary to decode all frames in a conventional animating image edition and to employ memories of a large capacity. Also, since each system of MPEG and H261 is encoding employing an intraframe correlation, it is necessary to apply an editing process after image data of all frames constituting animating images are decoded even when an edition of predetermined frames is executed, not the case of editing all frames of the animating images, and to encode the animating images again.

[0005]

The present invention is made in view of the foregoing problems and has an object of providing an animating image editing apparatus which makes memories of a large capacity unnecessary when executing the editing

process of the encoded animating image data. It is another object of the present invention is to provide an animating image editing apparatus of minimizing image data to be decoded when executing the editing process of predetermined frames.

[0006]

[Means for solving the Problems]

To this end, an animating image editing apparatus according to the present invention comprises decoding means for decoding encoded animating image data; storing means for intraframe coding and storing said decoded animating image data; editing means for decoding the images which were stored in said storing means and were intraframe encoded and for performing and arbitrary edition; and coding means for coding said edited frame image by an animating image coding system.

[0007]

Further, the animating image editing apparatus comprises intraframe detecting means for detecting an intraframe in encoded animating image data; decoding means for decoding the animating image data of a predetermined number of frames after the frame detected by said intraframe detecting means; storing means for storing the animating image data decoded by said decoding means on a frame unit basis; editing means for performing an arbitrary edition to the images of the frame unit stored in said storing means; and coding means for encoding said edited frame images by an

animating image coding system.

[0008]

According to the foregoing construction, the animating image data which was encoded by the animating image coding system using the interframe correlation is once encoded by the intraframe coding system and is animating image edited and is again encoded by the animating image coding system. Thus, the animating image data of the coding data which cannot be directly animating image edited so far can be edited. The capacity of the image memory that is needed during the editing operation can be remarkably reduced.

[0009]

Further, since the amount of animating image data to be decoded when a predetermined frame is edited can be decreased, the memory capacity can be saved and the processes can be executed at a high speed.

The present invention is not limited to the foregoing embodiments but many modifications and variations are possible within the spirit and scope of the appended claims of the invention.

[0010]

[Embodiments]

The first embodiment will now be described with respect to the case where the MPEG system is used as a coding system of animating image coding data which is inputted, the JPEG system is used as an intraframe coding

system that is used in the apparatus, all of the frames of the animating image coding data which is inputted are code converted, and an editing operation is executed.

[0011]

Fig. 1 is a constructional diagram of the animating image editing apparatus of the embodiment. Reference numeral 1 denotes a system bus to control the whole system; 2 a code converting unit I for decoding animating image coding data that is inputted and for converting into the intraframe coding data; 3 an animating image editing unit for decoding the internal coding data and for performing an animating image edition; an 4 a code converting unit II for again converting the result of the animating image edition to the animating image coding data.

[0012]

Fig. 2 shows a detailed block construction of each processing unit. In the diagram, the same blocks as those shown in Fig. 1 are designated by the same reference numerals.

[0013]

The code converting unit I (2) comprises three blocks 20, 21, and 22. Reference numeral 20 denotes an MPEG decoder for decoding a bit stream which is animating image coding data that is inputted and which was encoded by the MPEG system; 21 denotes a JPEG encoder for encoding the decoded frame image data by the JPEG system as an intraframe code; and 22 a memory or file to store an output of the JPEG

encoder 21.

[0014]

The animating image editing unit 3 comprises five blocks 22, 24, 25, 26, and 22. Reference numeral 24 denotes denotes a JPEG decoder; 25 an editing unit to edit the animating image on a frame unit basis; 26 a JPEG encoder to JPEG encode the image data edited by the editing unit 25 on the frame unit basis; and 22 the memory or file to store an output of the JPEG encoder 26.

[0015]

The code converting unit 4 comprises two blocks 22 and 29. Reference numeral 29 denotes an MPEG encoder to encode by the MPEG system.

[0016]

A processing procedure of the animating image editing apparatus of the first embodiment will now be described hereinbelow with reference to Fig. 2.

[0017]

First, when the animating image coding data which is inputted and encoded by the MPEG system is designated from the user by using a pointing device such as a mouse or the like (not shown), the designated animating image coding data is sequentially decoded by the MPEG decoder 20 in the code converting unit 2 in accordance with the order of the MPEG bit stream. Subsequently, the image data of every frame as an output result is inputted to the JPEG encoder 21 and is JPEG encoded on a frame unit basis and is stored into the

memory or file 22. The user retrieves an frame to be edited from the image data which was stored in the memory or file 22 was JPEG encoded, so that an animating image editing process can be performed.

[0018]

As an animating image edition, the frame designated by the user is read out from the memory or file 22 and is decoded by the JPEG decoder 24 and is returned to the frame image. An editing operation is executed by the editing unit 25 to the image data returned to the frame image. The editing operation in the embodiment denotes that the image data itself in the frame is rewritten. The frame image after completion of the editing operation is again encoded every frame image by the JPEG encoder 26 in order to store into the memory or file 22. When there are a plurality of frames to be edited, the above editing operation is repeated. After completion of the editing operations of all of the frame images, the coding data which was JPEG encoded every frame by the code converting unit 4 is read out from the memory or file 22. The animating image encoding is executed in the MPEG encoder 29 by the MPEG system to all of the frames.

[0019]

According to the embodiment as mentioned above, after the intraframe coding using the JPEG system was performed to the input animating image coding data encoded by the MPEG system, the picture plane to be edited is

retrieved and is subjected to the editing process and the animating image encoding is again executed. Thus, the animating image coding data can be edited and the required memory capacity can be remarkably reduced.

[0020]

<Second Embodiment>

The first embodiment has been described with respect to the example in which after all of the image date which had been animating image encoded by the MPEG system was decoded, it is edited. The second embodiment will be explained with respect to the case where only the image data of the portions necessary for edition is decoded from the image data which was animating image encoded by the MPEG system and is subjected to the editing process.

[0021]

In the second embodiment, it is assumed that the image data which was animating image encoded by the MPEG system is intraframe encoded (intra-picture) every 15 frames. It is also assumed that 20 frames within a range from the 20th frame to the 40th frame are used as frames to which the user performs the editing process.

[0022]

In this case, the image data which is inputted and was animating image encoded by the MPEG system has a construction as shown at 38 in Fig. 3. In the diagram, reference numerals 30 to 34 denote positions of the intra-picture in the image data which is inputted and was

animating image encoded by the MPEG system. For example, the intra-picture 30 indicates the 0th frame. The next intra-picture 31 indicates the 15th frame. In case of the embodiment, since 20 frames (the 20th frame to the 40th frame) are edited, it is sufficient to decode and edit the data with a range from the intra-picture 31 to the intra-picture 33 in a bit stream 38.

[0023]

A construction to execute the above processes will now be described with reference to Fig. 4.

[0024]

In the diagram, blocks which execute operations similar to those in the first embodiment are designated by the same reference numerals. In the diagram, reference numeral 40 denotes an intra-detector to detect a frame image as an intra-picture in the image data which was animating image encoded by the MPEG system.

[0025]

First, the bit stream 38 is inputted to the intra-detector 40. After that, the data within a range from the intra-picture 30 to the frame before the intra-picture 31, namely, to the 14th frame is outputted to a line 41 as an inputted bit stream and is stored into a predetermined file. When the code of the intra-picture 31 is detected, the frames of the intra-picture 31 and subsequent intra-pictures are outputted to a line 42 in order to perform the editing process. The data of the bit stream outputted to the line

42 passes through the MPEG decoder 20 and JPEG encoder 21 and each frame is encoded by the JPEG system and is supplied to the memory or file 22. The intra-detector 40 outputs the signal to the line 42 until the code of the intra-picture 33 is detected. After the code of the intra-picture 33 was detected, the output is again returned to the line 41 and the subsequent bit stream is outputted to another file different from the above file.

[0026]

Coding data 35 and 37 are filed as mentioned above without being subjected to the editing process.

[0027]

Processes such that the user edits the 20 frames (the 20th to 40th frame) will now be explained.

[0028]

The frames (the 15th to 44th frame) have been stored in the memory or file as coding data which was encoded by JPEG system. The JPEG coding data within a range from the 20th frame to the 40th frame is read out from the memory or file 22 and is decoded by the JPEG decoder 24, so that the image data is formed.

[0029]

After that, the frames (the 20th to 40th frames) are edited by the editing unit 25 and are JPEG encoded by the JPEG encoder 21 and are stored into the memory or file 22. After completion of the editing operation, the JPEG coding data is read out from the memory or file 22 and is decoded

into the image data by the JPEG decoder 24. The image data is further MPEG encoded by the MPEG encoder 29 and is outputted to a file or the like. The output result is filed as coding data 36 in Fig. 3.

[0030]

The coding data 35, 36, and 37 are finally rearranged into a bit stream as one coding data by a CPU or the like (not shown), so that the edition of only the necessary frames which are desired by the user can be performed.

[0031]

In the second embodiment, after completion of the animating image edition, the frames edited by the JPEG system are again encoded by the MPEG system. However, the invention is not limited to such a construction. It is also possible to construct as follows. Namely, the image data after the edition is stored into the memory or file 22 without being JPEG encoded. Only the frames which are not subjected to the editing process, namely, only the frames (the 15th to 19th frames and the 41st to 44th frames) as JPEG codes are decoded by the JPEG decoder 24 in the embodiment. The edited frames which are not encoded are directly outputted to the MPEG encoder without passing through the JPEG decoder 24.

[0032]

With the above construction, when the animating image edition is executed to a predetermined frame, an

amount of image data to be decoded can be reduced, so that the memory capacity to store the image data after it was decoded can be reduced. The time that is required for decoding can be also decreased. Consequently, the animating image edition can be executed at a high speed.

[0033]

<Third Embodiment>

The above second embodiment has been described with respect to the case of using the JPEG system as an intraframe coding system. However, as shown in Fig. 5, the encoding process can be also performed by the intra-pictures in an MPEG chip. In the diagram, the component elements which execute the similar operations as those of the component elements in the first and second embodiments are designated by the same reference numerals.

[0034]

The third embodiment differs from Fig. 4 as a block diagram of the second embodiment with respect to a point that an MPEG encoder 50 is used in place of the JPEG encoder 21 and an MPEG decoder 51 is used in place of the JPEG decoder 24.

[0035]

The detailed operations are substantially the same as those in the second embodiment except that the portions which are stored into the memory or file 22 are the coding data of the intra-pictures of the MPEG. Therefore, the description of the operation principle is omitted here.

[0036]

Although the MPEG system has been used as an animating image coding system of the input in the third embodiment, the invention is not limited to such a system but can be also obviously applied to the H261 system or, further, to another animating image coding system.

[0037]

Although the internal coding system has been described with respect to the JPEG system and the intra-pictures of the MPEG, the invention is not limited to them but can be also applied to any system so long as it is the intraframe coding system.

[0038]

Although the embodiments have been described with respect to the example in which the image in the frame is changed as an animating image edition, the invention is not limited to such an edition. It is also possible to change the number of frames or to execute an editing operation in the time base direction such as extraction of frames, insertion of frames, or the like.

[0039]

It will be also obviously understood that the animating image coding data is communicated from external communicating means in a real-time manner.

[0040]

When the image data stored in the memory or file 22 is edited, the image of only the low frequency component is

decoded from the image data of one frame and is displayed on a monitor (not shown), thereby deciding the edition image by using the image of a low resolution. After that, all of the images of one frame are displayed and are subjected to the actual editing process. Thus, the editing process can be performed at a high speed.

[0041]

[Effect of the Invention]

As described above, according to the present invention, the animating image data which was encoded by the animating image coding system using the interframe correlation is once encoded by the intraframe coding system and is animating image edited and is again encoded by the animating image coding system. Thus, the animating image data of the coding data which cannot be directly animating image edited so far can be edited. The capacity of the image memory that is needed during the editing operation can be remarkably reduced.

Further, since the amount of animating image data to be decoded when a predetermined frame is edited can be decreased, the memory capacity can be saved and the processes can be executed at a high speed.

The present invention is not limited to the foregoing embodiments but many modifications and variations are possible within the spirit and scope of the appended claims of the invention.

[BRIEF DESCRIPTION OF THE DRAWINGS]

Fig. 1 is a block diagram showing a constructional outline of a system according to the present invention;

Fig. 2 is a block diagram of a main section of the first embodiment;

Fig. 3 is an explanatory diagram of the second embodiment;

Fig. 4 is a block diagram of a main section of the second embodiment; and

Fig. 5 is a block diagram of a main section of the third embodiment.

[Description of Reference Numerals]

1 ... System bus

2 ... Code conversion unit I

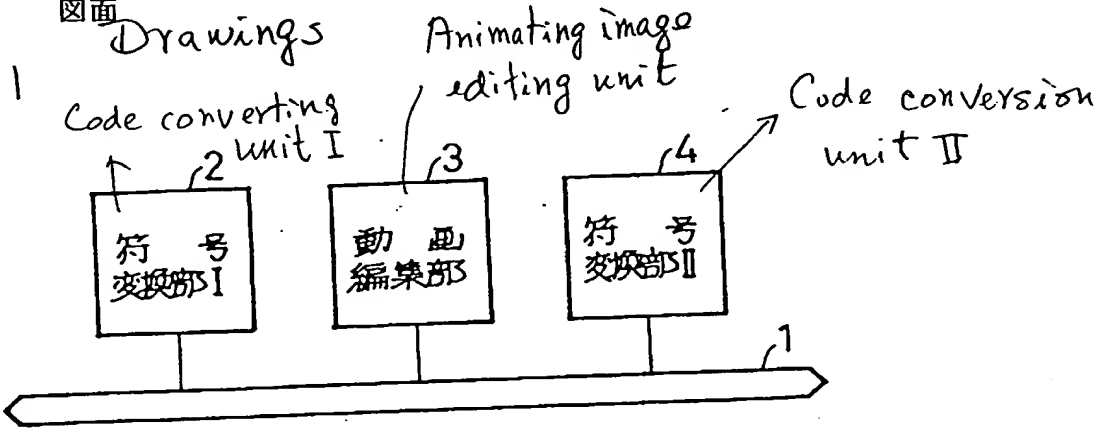
3 ... Animating image editing unit

4 ... Code converting unit II

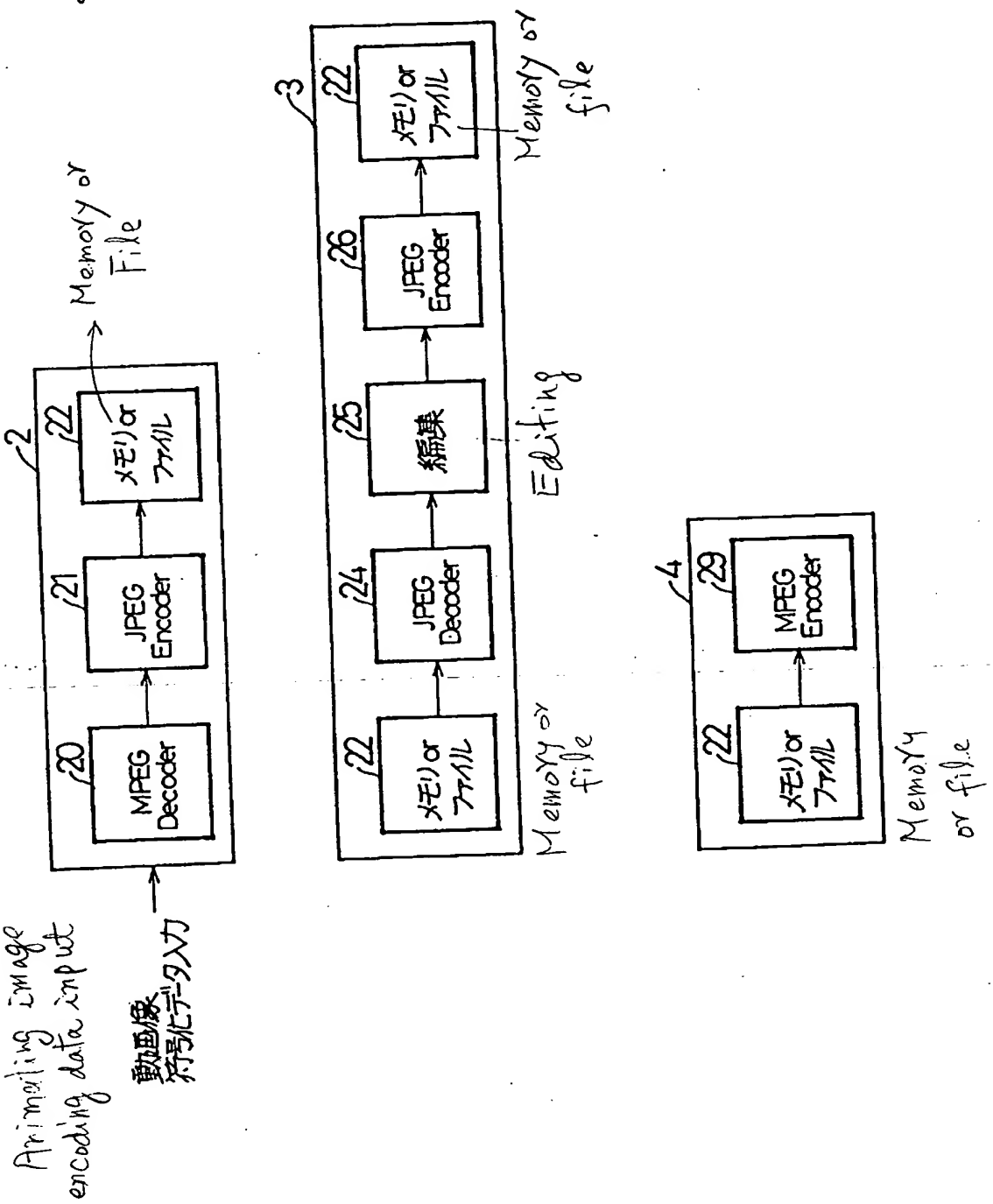
(Name of the Document)

【書類名】 図面 Drawings

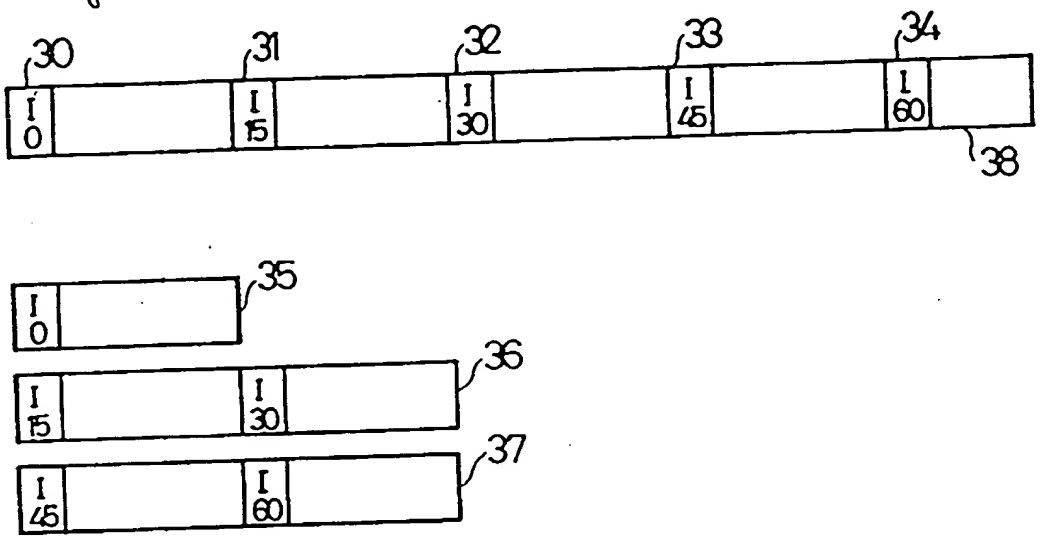
【図１】 Fig. 1



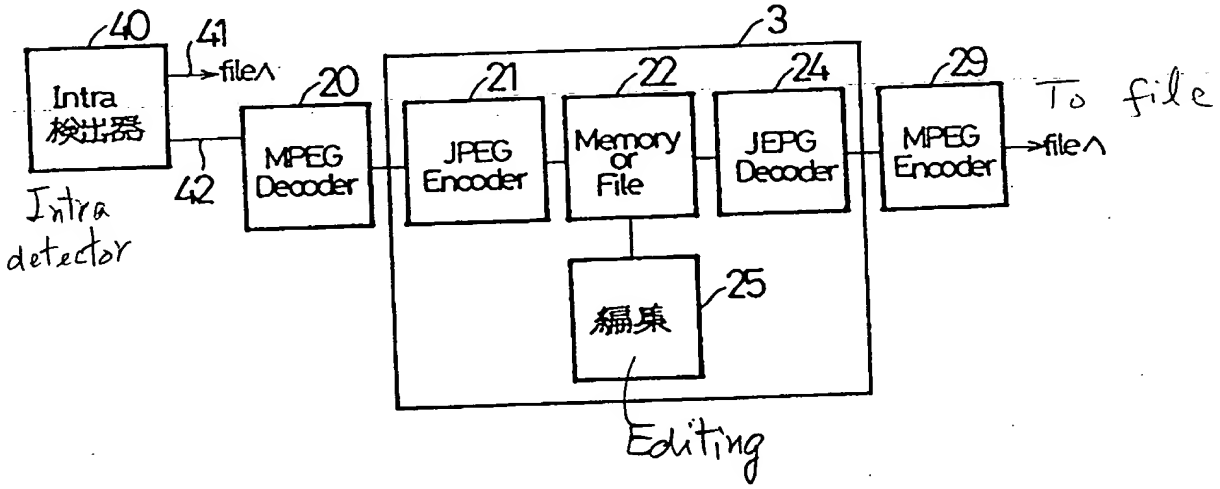
【図２】 Fig. 2


2
120
MPEG Decoder
121
JPEG Encoder
122
メモリor ファイル
Memory or File
動画像符号化データ入力
Arimaging image encoding data input
3
122
メモリor ファイル
124
JPEG Decoder
125
編集
Editing
126
JPEG Encoder
122
メモリor ファイル
Memory or file
Memory or file
4
129
MPEG Encoder
122
メモリor ファイル
Memory or file

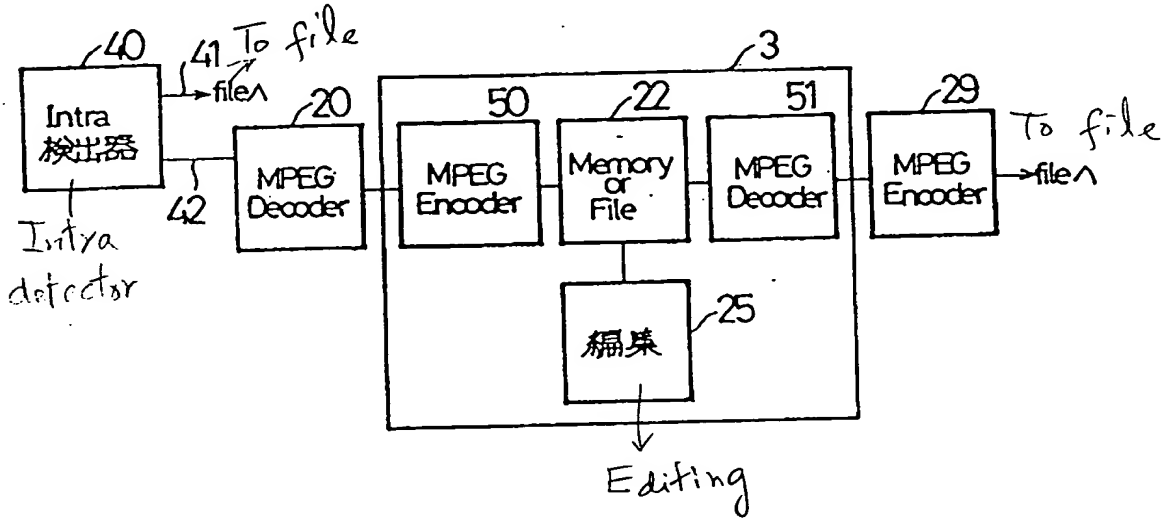
【図３】 Fig. 3



【図４】 Fig. 4



【図５】 Fig.5


40
41
To file
file へ
Intra
検出器
20
MPEG
Decoder
42
Intra
detector
3
50
MPEG
Encoder
22
Memory
or
File
51
MPEG
Decoder
29
MPEG
Encoder
To file
file へ
編集
25
Editing

[NAME OF THE DOCUMENT] Abstract

[Abstract]

[Object]

To reduce the memory capacity and increase the speed of processing while executing the animating image edition.

[Construction]

The animating image editing apparatus comprises decoding means 20 for decoding encoded animating image data; storing means 22 for intraframe coding and storing said decoded animating image data; editing means 3 for decoding the images which were stored in said storing means and were intraframe encoded and for performing an arbitrary edition; and coding means 4 for coding said edited frame image by an animating image coding system.

[Elected Drawing] Figure 2